A PRELIMINARY INVESTIGATION OF THE CADDIS-FLIES (INSECTA: TRICHOPTERA) OF THE QUEENSLAND WET TROPICS

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Abstract

A checklist of the trichopteran fauna of the Queensland Wet Tropics is presented. The species composition of at least 217 taxa, including 95 new species and four new genera, is summarised and discussed with reference to the overall Australian fauna and available information on the Trichoptera fauna of several eastern Australian areas.

Introduction

The Queensland Wet Tropics (QWT), including the Wet Tropics World Heritage Area, lies along the east coast of Australia between Cooktown in the north and Townsville in the south, extending inland to the Atherton Tableland (Fig. 1.). Proclamation of the Wet Tropics World Heritage Area was recognition of the environmental significance and sensitivity and the cultural importance of the region. The Wet Tropics Management Authority funded several studies of the local fauna and flora and this paper summarises our findings on the Trichoptera fauna.

The study was based on material from 151 sites held in various Australian museum collections (22,549 specimens: 10,527 ♂♂, 9213 ♀♀, 2297 larvae and 512 pupae). Sites were grouped into investigation areas numbered 1-10 (Fig. 1), which enabled a preliminary assessment of regional variations in the Wet Tropics Trichoptera fauna, using the PATN programs Decorana and Twinspan (Belbin 1988). The criteria for grouping sites into investigation areas was latitudinal except for areas 4-7. These areas occupy similar latitudes but represent vastly different habitats. Investigation area 5 represents low coastal areas, while area 7 comprises sites on the Atherton Tableland. Investigation area 4 (Kuranda district) represents a region between the lowlands and the Atherton Tableland, while area 6 (Bellenden Ker and Mt Bartle Frere) represents high altitude sites.

Results

Taxa identified during this study are listed in Table 1. The number of taxa is greater than the actual number of species present, as adults and immatures of some species have been listed as separate taxa due to the lack of association of life stages. The checklist represents, in effect, a taxonomic appraisal of all families found within the QWT. The specific epithet of each new species has been assigned a genitalia preparation number unique to that species (eg. PT-2010 or CT-221) and such numbers will be included in future published descriptions.

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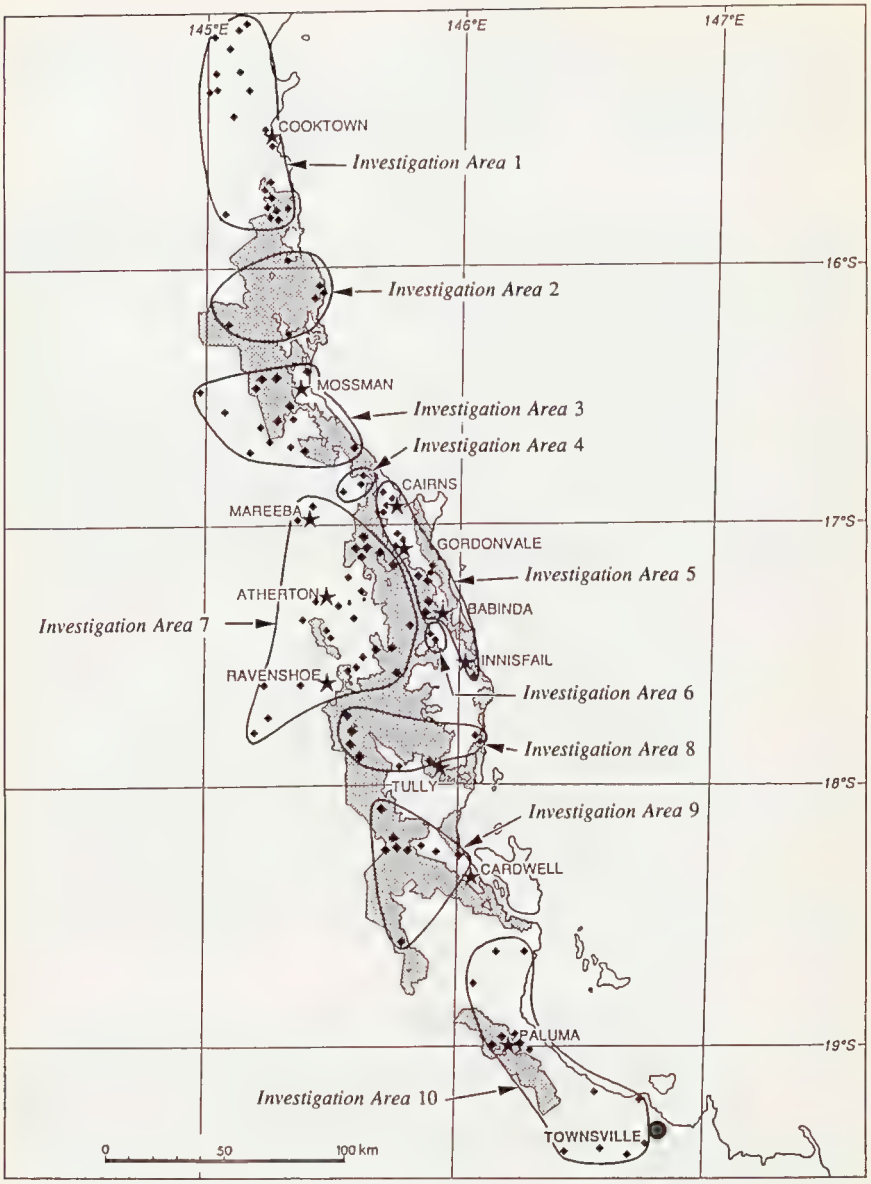

Fig. 1. Map of Queensland Wet Tropics, including the World Heritage Area (shaded) and showing collection sites (diamond symbols) and investigation areas (circled and numbered). Note: Star symbols mark major towns.

Table 1. Trichoptera species checklist for the Queensland Wet Tropics, with presence or absence within each investigation area noted. (Note: L - denotes taxa recorded as larvae only.)

INVESTIGATION AREAS	1	2	3	4	5	6	7	8	9	10
TRICHOPTERA										
Antipodoeciidae										
Antipodoecia turneri Mosely	+	-	-	-	+	-	-	-	+	+
Atriplectididae										
Atriplectides dubius Mosely	-	-	+	-	+	-	+	-	-	-
Atriplectides sp. nov. PT-2010	-	-	-	-	+	-	-	-	+	-
Calamoceratidae										
Anisocentropus banghaasi Ulmer	+	-	-	-	+	-	-	+	+	-
Anisocentropus kirramus Neboiss	+	-	+	-	+	+	+	-	+	+
Anisocentropus latifascia (Walker)	+	+	+	-	-	-	+	-	-	-
Anisocentropus semiflavus Banks	-	+	+	-	+	-	+	+	+	-
Anisocentropus sp. 1 (L)	+	-	-	-	+	-	+	+	-	-
Anisocentropus sp. 2 (L)	-	-	-	-	-	-	-	-	+	-
Anisocentropus sp. 3 (L)	+	-	+	-	+	-	+	+	+	+
Anisocentropus sp. 4 (L)	+	+	-	-	-	-	+	-	-	+
Anisocentropus torulus Neboiss	+	-	+	+	+	-	+	+	+	-
Anisocentropus spp. indet.	-	-	+	-	+	-	+	+	-	+
Calocidae										
Caenota galeata Neboiss	-	-	+	-	-	-	-	-	-	-
Caenota monteithi Neboiss	-	-	-	-	-	+	+	-	-	-
Caenota nemorosa Neboiss	-	-	+	+	+	-	+	+	+	+
Calocoides aquilonia Neboiss	+	+	+	-	+	-	+	-	+	-
Gen ? sp. A (L)	-	-	-	-	-	-	-	-	+	-
Gen ? sp. B (L)	-	-	+	-	+	-	-	-	-	-
Gen ? sp. C (L)	-	-	-	-	+	-	+	-	+	-
Gen ? sp. E (L)	-	-	-	-	+	-	+	-	-	-
Gen. nov. sp. F (L)	-	-	+	+	+	-	+	-	-	-
Pliocaloca dasodes Neboiss	+	-	-	-	-	+	-	-	-	-
Pliocaloca fastigiata Neboiss	-	-	-	-	-	+	+	-	-	-
Pliocaloca mucronata Neboiss	-	-	-	-	-	+	-	-	-	-
Conoesucidae										
Coenoria sp. nov. PT-2022	-	-	-	-	+	-	+	-	-	-
Coenoria sp. nov. PT-2041	-	-	+	-	-	-	-	-	-	-
Gen ? sp. D (L)	-	-	-	-	-	-	+	-	-	-
Dipseudopsidae										
Hyalopsyche disjuncta Neboiss	-	-	-	-	+	-	-	-	-	-
Ecnomidae										
Ecnomina sp. nov. CT-229	-	-	-	-	+	+	-	-	+	-
Ecnomina sp. nov. CT-230	-	-	-	-	-	+	-	-	-	-
Ecnomina sp. nov. CT-231	-	-	-	-	-	+	-	-	+	+
Ecnomina sp. nov. CT-232	-	-	-	-	-	+	-	-	-	-
Ecnomina sp. nov. CT-233	-	-	-	-	-	-	-	-	-	+

Table 1 (cont.). Trichoptera species checklist for the Queensland Wet Tropics, with presence or absence within each investigation area noted. (Note: L - denotes taxa recorded as larvae only.)

INVESTIGATION AREAS	1	2	3	4	5	6	7	8	9	10
Ecnomidae (cont.)										
Ecnomina sp. nov. CT-234	-	-	+	-	+	-	+	+	-	+
Ecnomina sp. nov. CT-235	-	-	-	-	+	-	-	-	-	-
Ecnomina sp. nov. CT-236	-	-	-	-	-	-	-	-	-	+
Ecnomina sp. nov. CT-237	-	-	-	-	-	-	-	+	-	-
Ecnomina sp. nov. D3 (L)	+	-	-	-	-	-	-	-	+	-
Ecnomina sp. nov. E2 (L)	-	-	-	-	-	-	-	-	+	-
Ecnomina sp. nov. F5 (L)	-	-	+	-	-	-	-	-	-	-
Ecnomina sp. nov. F6 (L)	-	-	-	-	-	-	-	-	+	-
Ecnomina sp. nov. PT-1590	-	-	-	-	-	-	-	-	+	-
Ecnomina sp. nov. PT-1591	-	-	-	+	+	-	-	-	+	+
Ecnomina sp. nov. PT-1592	-	-	-	-	-	-	-	-	+	+
Ecnomina sp. nov. PT-1651	-	-	-	-	-	-	-	+	+	+
Ecnomina spp. indet.	+	+	-	-	+	+	+	+	+	-
Ecnomus clavatus Cartwright	-	-	-	-	-	-	-	-	-	+
Ecnomus continentalis Ulmer	-	-	+	+	+	-	+	-	+	+
Ecnomus cuspidis Cartwright	-	-	-	-	-	-	+	-	-	+
Ecnomus kerema Cartwright	-	-	-	-	-	-	-	-	+	-
Ecnomus kinka Cartwright	-	-	+	-	-	-	-	-	-	+
Ecnomus kitabal Cartwright	-	-	-	-	+	-	-	-	-	-
Ecnomus larakia Cartwright	-	-	-	-	-	-	-	-	-	+
Ecnomus miriwud Cartwright	-	-	+	-	-	-	-	-	-	-
Ecnomus pilbarensis Cartwright	-	-	-	-	-	-	-	-	-	+
Ecnomus tropicus Cartwright	-	-	-	-	-	-	-	-	-	+
Ecnomus turrbal Cartwright	-	-	-	-	+	-	+	-	-	+
Ecnomus wagengugurra Cartwright	+	-	-	-	-	-	+	-	-	-
Ecnomus wellsae Cartwright	-	-	-	-	-	-	+	-	+	+
Ecnomus woronan Cartwright	-	-	-	-	-	-	-	-	-	+
Ecnomus spp. indet.	-	-	+	+	+	-	+	+	-	+
Glossosomatidae										
Agapetus sp.	-	-	-	-	-	-	-	+	+	-
Agapetus sp. nov. PT-2011	-	-	-	-	+	-	+	-	-	+
Agapetus sp. nov. PT-2025	-	-	-	-	+	-	-	-	-	-
Helicophidae										
Alloecella sp. nov. PT-2016	-	-	+	-	-	-	-	-	-	-
Helicopha sp. nov. PT-2019	+	-	+	-	-	-	+	-	+	+
Helicopsychidae										
Helicopsyche heacota Mosely	-	-	-	-	-	-	-	-	+	-
Helicopsyche sp. 5 (L)	-	+	-	-	-	-	-	+	-	-
Helicopsyche sp. 6 (L)	+	-	-	-	+	-	+	+	+	+
Helicopsyche sp. 7 (L)	+	-	-	-	-	-	-	+	-	-
Helicopsyche spp. indet.	+	+	+	+	+	+	+	+	+	+

Table 1 (cont.). Trichoptera species checklist for the Queensland Wet Tropics, with presence or absence within each investigation area noted. (Note: L - denotes taxa recorded as larvae only.)

INVESTIGATION AREAS	1	2	3	4	5	6	7	8	9	10
Hydrobiosidae										
Apsilochorema gisbum (Mosely)	+	+	-	-	-	-	+	+	+	-
Apsilochorema obliquum (Mosely)	-	+	+	-	+	+	+	-	+	+
Ethochorema brunneum (Mosely)	+	+	+	+	+	+	+	+	+	+
Ptychobiosis nigrita (Banks)	-	+	+	-	+	+	+	-	+	+
Ulmerochorema seona (Mosely)	-	-	+	-	-	-	-	-	-	-
Ulmerochorema stigma (Ulmer)	+	+	+	+	+	-	+	+	+	+
Ulmerochorema sp. nov. PT-1036	-	+	+	-	+	+	+	-	+	+
Hydropsychidae										
Aethaloptera sexpunctata (Kolenati)	-	-	-	-	+	+	-	+	-	-
Asmicridea sp.	-	+	-	+	+	+	+	+	+	-
Asmicridea sp. 4 (L)	-	-	+	-	+	-	+	+	-	-
Asmicridea sp. 5 (L)	+	+	-	-	+	-	+	-	-	-
Baliomorpha banksi (Mosely)	+	+	+	+	+	-	+	-	+	+
Cheumatopsyche sp. nov. 11 (L)	-	+	-	-	-	-	-	-	-	-
Cheumatopsyche sp. nov. 12 (L)	+	-	+	-	-	-	+	-	-	-
Cheumatopsyche sp. nov. 13 (L)	+	+	-	-	-	-	-	-	+	-
Cheumatopsyche sp. nov. 14 (L)	-	-	-	+	+	-	+	+	+	+
Cheumatopsyche sp. nov. 15 (L)	+	+	+	+	+	-	+	+	-	+
Cheumatopsyche sp. nov. 16 (L)	+	-	+	+	+	-	+	+	+	-
Cheumatopsyche sp. nov. 17 (L)	-	-	-	-	+	-	-	-	-	-
Cheumatopsyche sp. nov. 19 (L)	-	+	-	-	-	-	-	+	-	-
Cheumatopsyche sp. nov. 22 (L)	-	-	-	-	-	-	+	-	+	-
Cheumatopsyche spp. indet.	+	+	+	+	+	+	+	+	+	+
Diplectrona sp. nov. 7 (L)	-	-	+	+	-	-	+	+	+	-
Diplectrona sp. nov. 8 (L)	-	-	-	+	-	-	-	-	+	+
Diplectrona sp. nov. 10 (L)	-	-	-	-	+	-	+	-	-	-
Diplectrona sp. nov. PT-999	-	-	-	-	-	+	-	-	-	-
Diplectrona sp. nov. PT-1000	-	-	+	-	+	+	+	-	-	-
Diplectrona sp. nov. PT-1002	-	-	-	-	-	+	-	+	+	-
Diplectrona sp. nov. PT-1003	-	-	+	-	-	-	-	-	-	-
Diplectrona sp. nov. PT-1012	-	-	-	-	-	+	-	-	-	-
Diplectrona sp. nov. PT-1016	-	+	-	-	-	-	-	-	-	-
Diplectrona sp. nov. PT-1031	-	-	-	-	-	+	-	-	-	-
Diplectrona sp. nov. PT-1040	-	-	+	-	+	-	+	-	-	-
Diplectrona sp. nov. PT-2007	-	-	+	-	-	-	-	-	-	-
Diplectrona sp. nov. PT-2042	+	-	-	-	-	-	-	-	-	-
Macrostemum saundersii (McLachlan)	+	-	-	-	-	-	-	-	-	-
Smicrophylax sp. 5 (L)	+	-	+	-	-	-	-	+	+	-
Smicrophylax sp. 6 (L)	-	-	+	-	-	-	-	-	-	-
Smicrophylax ulmeri (Banks)	-	-	+	+	+	+	+	+	+	+
Smicrophylax spp. indet.	+	+	+	+	+	-	+	+	+	-

Table 1 (cont.). Trichoptera species checklist for the Queensland Wet Tropics, with presence or absence within each investigation area noted. (Note: L - denotes taxa recorded as larvae only.)

INVESTIGATION AREAS	1	2	3	4	5	6	7	8	9	10
Hydroptilidae										
Acanthotrichia bilamina Wells	-	-	-	-	-	-	-	-	+	+
Acritoptila capistra Wells	-	-	-	-	-	-	-	-	+	-
Acritoptila pearsoni Wells	-	-	-	-	-	-	-	-	+	-
Acritoptila sp. indet.	-	-	-	-	-	-	-	-	+	-
Chrysotrichia australis Wells	-	-	-	-	-	-	-	-	+	-
Gnathotrichia australiensis Wells	-	-	-	-	-	-	-	-	-	+
Hellyethira cornuta Wells	+	+	-	-	+	-	+	-	+	+
Hellyethira cubitans Wells	-	-	-	-	+	-	-	-	-	+
Hellyethira eskensis (Mosely)	-	-	-	-	+	-	+	-	-	+
Hellyethira imparalobata Wells	-	-	-	-	-	-	-	-	+	-
Hellyethira quadrata Wells	-	-	-	-	-	-	-	-	+	+
Hellyethira simplex Mosely	-	-	-	-	+	-	+	-	+	+
Hellyethira sp. nov.	-	-	-	-	-	-	-	-	-	+
Hellyethira sp. nov. A	-	-	-	-	-	-	-	-	-	+
Hellyethira spinosa Wells	-	-	-	-	-	-	-	-	+	-
Hellyethira vernoni Wells	-	-	-	-	+	-	-	+	+	+
Hellyethira spp. indet.	+	-	-	-	+	-	+	-	+	+
Hydroptila incertula Mosely	-	-	-	-	-	-	-	-	+	+
Hydroptila losida Mosely	-	-	-	-	-	-	-	-	+	+
Hydroptila obscura Wells	-	-	-	-	+	-	+	+	+	+
Hydroptila scamandra Neboiss	-	-	-	-	-	-	+	+	+	-
Hydroptila spp. indet.	+	-	-	-	-	-	-	-	-	+
Maydenoptila kurandica Wells	-	-	-	+	-	-	-	-	-	-
Mulgravia coronata Wells	-	-	-	-	-	-	-	-	+	-
Orphninotrichia silicis Wells	-	-	-	-	-	-	+	-	-	-
Orthotrichia bensoni Wells	-	-	-	-	-	-	-	-	+	-
Orthotrichia bullata Wells	-	-	-	-	+	-	-	-	-	+
Orthotrichia conferta Wells	-	-	-	-	+	+	-	-	+	-
Orthotrichia constricta Wells	-	-	-	-	-	-	-	-	+	-
Orthotrichia divaricata Wells	-	-	-	-	+	-	-	-	+	-
Orthotrichia morula Wells	-	-	-	-	+	-	+	-	-	-
Orthotrichia sp. nov. A (*aberrans* group)	-	-	-	-	-	-	-	-	-	+
Orthotrichia turrita Wells	-	-	-	-	-	-	-	-	-	+
Orthotrichia velata Wells	-	-	-	-	-	-	-	-	+	+
Orthotrichia spp. indet.	+	-	-	+	-	-	+	-	+	+
Oxyethira bogambara Schmid	-	-	-	-	-	-	-	-	+	-
Oxyethira columba (Neboiss)	-	-	-	-	-	-	-	-	+	+
Oxyethira complicata Wells	-	-	-	-	-	-	-	-	+	+
Oxyethira spp. indet.	+	-	-	-	-	-	-	+	+	+
Oxyethira triangulata Wells	-	-	-	-	+	-	+	+	+	+
Stenoxyethira plumosa Wells	-	-	-	-	+	-	-	-	-	-

Table 1 (cont.). Trichoptera species checklist for the Queensland Wet Tropics, with presence or absence within each investigation area noted. (Note: L - denotes taxa recorded as larvae only.)

INVESTIGATION AREAS	1	2	3	4	5	6	7	8	9	10
Hydroptilidae (cont.)										
Stenoxyethira sp. indet.	-	-	-	-	-	-	-	+	-	-
Tricholeiochiton fidelis Wells	-	-	-	-	-	-	-	-	-	+
Tricholeiochiton sp. indet.	-	-	-	-	-	-	-	-	-	+
Xuthotrichia ochracea Mosely	-	-	-	-	-	-	-	+	-	-
Leptoceridae										
Gen. indet. sp.	-	-	+	-	+	-	+	-	-	-
Lectrides varians Mosely	-	-	+	-	-	-	-	+	-	+
Leptocerus assimulans (Ulmer)	+	-	+	-	-	-	-	-	-	-
Leptorussa darlingtoni (Banks)	-	-	+	-	-	-	-	-	-	-
Notalina spp. indet.	+	+	+	-	+	-	+	+	+	+
Notoperata sp. nov. PT-2014	+	+	+	-	-	-	+	+	+	+
Oecetis australis (Banks)	-	-	-	+	+	-	+	-	-	+
Oecetis burtoni Neboiss	+	-	+	-	-	-	-	-	-	+
Oecetis complexa Kimmins	-	-	-	-	+	-	+	-	-	+
Oecetis epekeina Neboiss	-	-	-	-	-	-	+	-	-	-
Oecetis inscripta Kimmins	-	-	-	-	+	-	-	-	-	-
Oecetis laustra Mosely	-	-	+	-	+	-	+	-	+	+
Oecetis multipunctata Ulmer	-	-	+	+	+	-	+	+	-	-
Oecetis oresbiosa Neboiss	+	-	-	+	+	-	-	-	+	-
Oecetis piptona Neboiss	-	-	-	-	+	-	+	-	-	-
Oecetis spp. indet.	+	+	+	+	+	+	+	+	+	+
Setodes bracteatus Neboiss	-	+	-	+	+	-	+	+	+	+
Symphitoneuria exigua (McLachlan)	-	-	+	-	-	-	+	-	+	-
Triaenodes sp.	-	-	-	-	-	-	-	-	-	+
Triaenodes sp. nov. PT-659	-	-	-	-	+	-	-	-	-	-
Triaenodes sp. nov. PT-756	-	-	-	-	-	-	-	-	-	+
Triaenodes sp. nov. PT-757	-	-	-	-	-	-	+	-	-	-
Triaenodes sp. nov. PT-759	-	-	-	-	+	-	-	-	-	-
Triaenodes sp. nov. PT-761	-	-	-	-	-	-	+	-	-	-
Triaenodes sp. nov. PT-763	+	-	+	-	-	-	-	-	-	-
Triaenodes sp. nov. PT-764	+	-	+	-	+	+	-	-	-	-
Triaenodes sp. nov. PT-767	+	-	-	-	+	+	-	-	+	+
Triaenodes sp. nov. PT-783	+	-	-	+	+	-	+	-	-	+
Triaenodes sp. nov. PT-800	-	-	+	-	-	-	-	-	-	+
Triaenodes sp. nov. PT-1090	-	-	-	-	-	+	-	-	-	-
Triaenodes sp. nov. PT-1091	-	-	-	-	-	+	-	-	-	-
Triaenodes sp. nov. PT-1116	-	-	-	-	-	-	-	-	+	+
Triaenodes sp. nov. PT-1117	-	-	-	-	-	-	-	+	-	+
Triaenodes sp. nov. PT-1122	-	-	-	-	-	-	+	-	-	-
Triaenodes sp. nov. PT-2021	-	-	-	-	-	-	-	-	-	+
Triaenodes sp. nov. PT-2040	-	-	-	-	-	-	+	-	-	-

Table 1 (cont.). Trichoptera species checklist for the Queensland Wet Tropics, with presence or absence within each investigation area noted. (Note: L - denotes taxa recorded as larvae only.)

INVESTIGATION AREAS	1	2	3	4	5	6	7	8	9	10
Leptoceridae (cont.).										
Triaenodes spp. indet.	+	-	+	-	+	-	+	-	+	-
Triaenodes volda Mosely	-	+	+	-	+	-	+	-	+	+
Triplectides australicus Banks	-	-	-	-	+	-	-	-	-	-
Triplectides australis Navas	-	-	-	-	-	-	+	-	+	-
Triplectides ciuskus Mosely	-	-	-	-	+	-	+	-	-	+
Triplectides dolabratusa Morse & Neboiss	-	-	+	-	-	+	-	+	+	-
Triplectides elongatus Banks	-	-	+	-	+	-	-	-	-	-
Triplectides gonetalus Morse & Neboiss	-	+	+	-	+	-	+	+	+	+
Triplectides hamatus Morse & Neboiss	-	-	-	-	-	-	-	-	-	+
Triplectides helvolus Morse & Neboiss	-	-	-	-	-	-	+	-	-	-
Triplectides liratellus Morse & Neboiss	-	-	-	-	+	-	-	-	-	-
Triplectides liratus Morse & Neboiss	+	+	-	-	-	+	+	-	+	+
Triplectides parvus (Banks)	+	-	-	+	+	-	+	-	+	+
Triplectides prolatus Morse & Neboiss	-	-	+	+	+	-	+	-	-	-
Triplectides rossi Morse & Neboiss	-	-	-	-	-	+	+	-	+	-
Triplectides similis Mosely	-	-	-	-	-	-	+	-	-	-
Triplectides spp. indet.	+	+	+	+	+	+	+	+	+	+
Triplectides tambina Mosely	-	-	-	-	-	-	-	-	-	+
Triplexa sp. nov. PT-1762	-	-	-	+	-	-	-	-	+	-
Westriplectes angelae Neboiss	-	-	-	-	+	-	-	-	-	-
Odontoceridae										
Barynema sp. nov. PT-1176	+	-	-	-	-	-	-	-	-	-
Barynema sp. nov. PT-1405	-	-	+	-	+	-	+	+	+	-
Barynema sp. nov. PT-2028	-	-	-	-	-	-	+	-	-	-
Marilia bola Mosely	+	-	+	-	-	-	+	-	+	-
Marilia fusca Kimmins (L)	-	-	-	-	-	-	+	-	-	-
Marilia spp. indet.	+	+	+	+	+	+	+	+	+	+
Philopotamidae										
Chimarra australica (Ulmer)	-	-	+	+	+	+	+	-	+	-
Chimarra monticola Kimmins	+	-	+	-	+	-	+	-	+	-
Chimarra sp. nov. 6 (L)	-	-	-	-	+	-	-	-	-	-
Chimarra sp. nov. 7 (L)	+	-	+	-	+	-	+	+	+	-
Chimarra sp. nov. 11 (L)	-	-	-	-	-	-	-	-	+	-
Chimarra sp. nov. CT-221	-	+	-	-	+	+	-	+	-	+
Chimarra sp. nov. CT-223	+	+	-	-	+	-	+	+	+	-
Chimarra sp. nov. CT-225	-	-	+	-	+	-	+	-	+	-
Chimarra sp. nov. CT-226	-	-	-	-	-	-	-	-	-	+
Chimarra sp. nov. CT-227	-	-	-	-	-	+	-	-	-	-
Chimarra sp. nov. CT-228	-	-	-	-	-	+	-	-	-	-
Chimarra spp. indet.	+	-	+	-	+	+	-	+	+	+
Chimarra uranka Mosely	+	+	+	+	+	-	+	+	+	+

Table 1 (cont.). Trichoptera species checklist for the Queensland Wet Tropics, with presence or absence within each investigation area noted. (Note: L - denotes taxa recorded as larvae only.)

INVESTIGATION AREAS	1	2	3	4	5	6	7	8	9	10
Philopotamidae (cont.)										
Gen. nov. sp. nov. PT-1640	-	-	-	-	+	-	-	-	+	-
Hydrobiosella sp. nov. 15 (L)	-	-	+	+	+	-	+	-	+	+
Hydrobiosella sp. nov. PT-1037	-	-	-	-	-	+	-	-	-	-
Hydrobiosella sp. nov. PT-1038	-	-	-	-	-	+	-	-	-	-
Hydrobiosella sp. nov. PT-1039	-	-	-	-	-	+	-	-	-	-
Hydrobiosella sp. nov. PT-1768	-	-	-	+	+	-	+	+	-	+
Hydrobiosella sp. nov. PT-2029	-	-	-	-	-	-	-	-	-	+
Hydrobiosella spp. indet.	-	-	-	-	-	+	+	-	+	+
Philorheithridae										
Aphilorheithrus sp. nov. PT-2038	-	-	+	-	-	-	-	+	+	+
Gen. Nov. P sp. nov. PT-1707	-	-	-	-	-	+	-	-	-	-
Gen. Nov. Q sp. nov. PT-1837	-	-	+	-	+	-	-	+	+	+
Polycentropodidae										
Gen. G sp. 1 (L)	-	-	-	-	-	-	+	-	-	-
Paranyctiophylax sp. nov. 5 (L)	-	-	-	-	-	-	-	-	+	-
Paranyctiophylax sp. nov. 7 (L)	-	-	-	-	-	-	-	-	+	-
Paranyctiophylax sp. nov. PT-1589	-	-	-	-	-	-	-	-	+	+
Paranyctiophylax sp. nov. PT-1625	-	-	-	-	-	-	-	-	+	-
Paranyctiophylax sp. nov. PT-1977	+	-	+	-	+	-	+	-	-	-
Paranyctiophylax sp. nov. PT-1979	+	-	+	-	+	-	+	-	+	-
Plectrocnemia sp. nov. PT-1817	+	-	+	-	+	-	+	-	+	+
Plectrocnemia sp. nov. PT-1822	-	-	+	-	-	+	+	-	+	+
Plectrocnemia sp. nov. PT-1976	-	-	-	-	-	-	-	-	+	-
Plectrocnemia spp. indet.	+	-	+	-	-	-	+	-	+	+
Polyplectropus sp. 2 (L)	-	-	+	-	-	-	+	-	+	-
Polyplectropus sp. 3 (L)	-	-	-	-	-	-	-	-	+	+
Polyplectropus sp. nov. PT-1821	-	-	+	+	+	+	+	+	+	-
Psychomyiidae										
Tinodes radona Neboiss	+	-	-	-	-	-	-	-	-	-
Zelandoptila yuccabina Neboiss	-	-	-	-	-	-	-	-	+	-
Stenopsychidae										
Stenopsychodes mjobergi Ulmer	+	-	+	+	+	+	+	+	-	+
Stenopsychodes sp. nov. A	-	-	-	-	-	+	-	-	+	-
Stenopsychodes sp. nov. B	-	-	-	-	-	+	-	-	+	-
Stenopsychodes sp. nov. C	-	-	+	-	+	+	+	+	+	-
Stenopsychodes sp. nov. D	-	-	-	-	-	+	-	-	-	-
Stenopsychodes sp. nov. E	-	-	-	-	-	+	-	-	-	-
Stenopsychodes sp. nov. F	-	-	-	-	-	+	-	-	-	-
Stenopsychodes spp. indet.	+	+	+	-	+	+	+	+	+	+
Tasimiidae										
Tasiagma sp.	-	-	-	-	-	-	+	+	-	-

A taxonomic summary of the QWT Trichoptera fauna is presented in Table 2. In total 217 species have been recognised, of which 95 species and four genera are undescribed. The highest number of species recorded at an individual site was 78 at Yuccabine Creek, while the 10 most specious sites yielded an average of 41.8 species.

Table 2. Taxonomic evaluation of the Queensland Wet Tropics Area Trichopteran fauna.

Total number of species:	217
Taxa identified from adult material:	202
Taxa identified from immature material:	79
Immature taxa clearly different from adult taxa:	15
Immature taxa associated with adults:	30
Immature taxa not associated with adults:	49
New species recognised:	95
New genera recognised:	4
New species based on adult material only:	83
New species based on immature material only:	12

The PATN analyses were performed separately on the adult and immature data (for full details see Walker *et al.* 1993). As expected, the larger adult data set provided better resolution between the investigation areas, although results from immatures supported those obtained for adults. The analyses separated the investigation areas into three groups, each with a distinctive faunal composition. Investigation areas 9 and 10 were grouped, investigation area 6 was unique and there were no significant faunal differences between the remaining seven investigation areas.

Discussion

Comparison of the trichopteran faunas of Australia, the Queensland Wet Tropics and the Tasmanian World Heritage Area (Table 3) indicates: higher species richness in the QWT, with 36.7% of the known Australian fauna, compared to 22.7% occurring in the TWHA; QWT has a higher maximum number of species occurring at an individual site and within a single Investigation Area than has the TWHA; the QWT has a similar number of families and genera as the TWHA, though the family composition differs between the two areas. Families present in the QWT and not found in the TWHA are Antipodoeciidae, Dipseudopsidae (formerly Hyalopsychidae: Wells and Cartwright, 1993a), Odontoceridae, Psychomyiidae, Calamoceratidae and Stenopsychidae. Families present in the TWHA and not found in the QWT are Kokiriidae, Limnephilidae, Oeconesidae and Plectrotarsidae.

Table 3. Comparison of the trichopteran faunas of Australia (AUS), the Queensland Wet Tropics (QWT) and the Tasmanian World Heritage Area (TWHA) (Note: In calculating the numbers of species, immature and 'spp. indet.' taxa were excluded if it was likely that they were conspecific with listed adult species; undescribed species and genera, recorded from the QWT, have been included in the total number of known Australian taxa. Sources of species composition: AUS- Neboiss, 1991, 1992; Wells, 1990; TWHA- Neboiss, Jackson & Walker, 1989).

	AUS	QWT	TWHA
Number of known families:	26	21	19
Number of known genera:	106	67	62
Number of known species:	590	217	134
Highest number of species within an Investigation Area:	-	100	91
Highest number of species at a single site:	-	78	45
Number of species in the 10 most specious Australian families:			
Hydroptilidae	121	39	10
Leptoceridae	102	51	28
Ecnomidae	67	24	5
Hydrobiosidae	58	7	26
Hydropsychidae	46	26	5
Philopotamidae	32	16	7
Conoesucidae	23	2	15
Calocidae	19	8	5
Philorheithridae	16	3	8
Calamoceratidae	10	5	0

The species richness within investigation areas of the QWT is remarkably high, with seven investigation areas yielding 50 or more species. Species richness observed at many sites was greater than recorded in southern Australia from the Tasmanian World Heritage Area (Neboiss *et al.* 1989). The average number of species for the ten most diverse sites in the two World Heritage Areas was 41.8 species for the QWT and 37.0 species for the TWHA. The highest number of species recorded at an individual site within the QWT was at Yuccabine Creek (78 species). This site exceeded the richest TWHA site, which yielded 45 species (Franklin River, Roaring Creek Junction) and also the 44 species recorded from the O'Shannassy River in Victoria (Dean and Cartwright 1987) and the 47 species recorded from Gunshot Creek, Cape York Peninsula (Wells and Cartwright 1993b). It should be noted that the species lists for Yuccabine Creek (Benson and Pearson 1988) and O'Shannassy River were the result of extensive collecting programs; lower species numbers at other sites may merely reflect a lesser

collecting effort. There is therefore evidence that Trichoptera species richness is probably greater in the QWT than in other areas of Australia.

While it is difficult to quantify the definition of a rare species, a qualitative assessment of the conservation status of taxa within the QWT has been attempted. For the purposes of this study, we have developed the following definitions:

- a species is defined as "rare" when known from less than four specimens;
- a species is defined as "localised" when known only from a single site;
- a species is defined as "vulnerable" when known from a single site and less than four specimens.

Using the above definitions, the conservation status of the Trichoptera fauna of the QWT is as follows:

- 52.1% (113 species) of the QWT Trichoptera fauna is "rare";
- 30.0% (65 species) of the QWT Trichoptera fauna is "localised";
- 22.1% (48 species) of the QWT Trichoptera fauna is "vulnerable";
- 77.1% (37 species) of the "vulnerable" fauna is presumed to be endemic to the QWT based on current knowledge.

Of the 113 species defined as rare, 54 species have been recorded from one or more of the three sites, Yuccabine Creek, Bellenden Ker Range and Birthday Creek Falls. Furthermore, these three sites have yielded 27 of 65 species known from single sites only and 18 of 48 species defined as vulnerable. On the basis of current information, these sites are worthy of special conservation consideration.

Although the Australian Trichoptera fauna is reasonably well known, it is significant that 43.8% of the species recorded from the QWTA are new to science. This demonstrates the value of involving taxonomic experts at an early stage of any faunal survey. Table 2 also highlights the disparity between knowledge of the adult and immature stages. While 202 of 217 recognised species (93.1%) were based on adult specimens, only 15 of 217 recognised species (6.9%) were based solely on immature specimens. Furthermore, of the 202 species recognised from adult material, only 30 species (14.9%) were associated with larvae. In fact, the larvae of more than half the total known species from the QWTA have not yet been collected, let alone associated with adults.

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